PATENT CLAIMS

1. Method for navigating in the interior of the body using three-dimensionally visualized structures, comprising the following steps:

- providing at least two two-dimensional images (50, 50') of the same anatomical object (12) from different perspectives and also of information which makes it possible to draw a conclusion about the respective spatial position of an imaging system (26) relative to the anatomical object (12);
- defining a projection (76, 76', 78, 78') of a geometrical structure (72, 80, 82) to be visualized or a part thereof in each two-dimensional image, wherein the geometrical structure (72, 80, 82) to be visualized is different from the anatomical object (12);
- generating a conical surface (40, 40') in space for every image (50, 50'), wherein the spatial positions of cone vertex (46, 46') and cone directrix are determined from the respective spatial position of the imaging system (26) and the shape of the cone directrix is determined from the shape of the projection (76, 76', 78, 78') of the geometrical structure (72, 80, 82) to be visualized;
- forming a spatial intersection of the individual conical surfaces (40, 40') to determine the geometrical structure (72, 80, 82); and
- displaying the geometrical structure (72, 80, 82) determined and/or an intersection (74) of a plurality of geometrical structures (72, 80, 82)

determined and using the representation for navigation.

2. Method according to Claim 1, characterized in that the created projection of the geometrical structure (72, 80, 82) is a point, a straight line (76, 76'), a circular segment (78, 78') or another structure having the form of a line.

3. Method according to Claim 1 or 2, characterized in that the geometrical structure to be visualized is a point (72), a straight line (82), a plane, a sphere (80) or another two-dimensional or three-dimensional structure.

4. Method according to Claim 1, 2 or 3, characterized in that the two-dimensional images (50, 50') are generated by X-ray methods and/or magnetoresonance methods.

5. Method according to one of Claims 1 to 4, characterized in that the spatial intersection is revised using at least one further data set of the anatomical object (12).

6. Method according to Claim 5, characterized in that a two-dimensional or three-dimensional image or a generic model of the anatomical object (12) is used as further data set.

7. Method according to one of Claims 1 to 6, characterized in that suitable perspectives are

determined for further two-dimensional images by inverse calculations.

8. Method according to one of Claims 1 to 7, characterized in that, additionally, the spatial position of an instrument (14) to be navigated is shown graphically relative to the geometrical structure (72, 80, 82) or to the intersection (74).

9. Method according to one of Claims 1 to 8, characterized in that the effective axis (60, 60', 60", 60''') of the surgical instrument (14) is shown graphically.

10. Method according to one of Claims 1 to 9, characterized in that the individual two-dimensional images (50, 50', 50", 50''') are shown graphically taking account of the positions (46, 46') from which the images were taken.

11. Method according to one of Claims 1 to 10, characterized in that a navigation aid in the form of a tunnel structure (92) is shown graphically.

12. Method according to Claim 11, characterized in that, in addition to the navigation aid (92), a separate direction indicator (96) is shown graphically for the navigation of the surgical instrument (14).

13. Method for navigating in the interior of the body using three-dimensionally visualized structures, comprising the following steps:

- providing at least two two-dimensional X-ray images (50, 50') of the same bone (12) from different perspectives, of information that makes it possible to draw conclusions about the respective spatial position of an X-ray imaging system (26) relative to the bone (12), and also a magnetoresonance data set of the bone (12);
- defining a projection (76, 76', 78, 78') of a surface or of an outline of the spongiosa of the bone (12) in every two-dimensional X-ray image;
- generating a conical surface (40, 40') in space for every image (50, 50'), wherein the spatial positions of cone vertex (46, 46') and cone directrix are determined from the spatial position of the imaging system (26) and the shape of the cone directrix is determined from the shape of the defined projection;
- forming a spatial intersection of the individual cone surfaces (40, 40') to determine a first model of the spongiosa;
- determining a second model of the spongiosa from the magnetoresonance data set;
- generating a representation of the bone (12) by combining the two models and use of the representation for the purpose of navigation.